

**NEW ENTITIES IN *ERIOGONUM* (POLYGONACEAE:
ERIOGONOIDEAE)**

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ABSTRACT

A series of new species and varieties of *Eriogonum* (Polygonaceae: Eriogonoideae) are validated for inclusion in forthcoming volumes of *Intermountain Flora* and *Flora of North America*. The new species are *E. artificis*, *E. evanidum*, *E. mitophyllum* and *E. terrenatum*. The new varieties are *E. brevicaule* var. *caelitum*, *E. corymbosum* var. *heilii*, *E. corymbosum* var. *nilesii*, *E. douglasii* var. *elkoense*, *E. douglasii* var. *meridionale*, *E. heermannii* var. *subspinosum*, *E. microthecum* var. *arceuthinum*, *E. microthecum* var. *lacus-ursi*, *E. microthecum* var. *schoolcraftii*, *E. prociduum* var. *mystricum*, *E. umbellatum* var. *ahartii*, *E. umbellatum* var. *canifolium*, *E. umbellatum* var. *lautum*, *E. umbellatum* var. *mohavense*, *E. umbellatum* var. *nelsoniorum*, *E. umbellatum* var. *ramulosum*, *E. umbellatum* var. *sandbergii* and *E. umbellatum* var. *stragulum*. One variety, *E. microthecum* var. *lacus-ursi*, is proposed jointly with Andrew C. Sanders.

KEY WORDS: Polygonaceae, Eriogonoideae, *Eriogonum*.

In the process of preparing treatments of Polygonaceae Juss. subfam. Eriogonoideae Arn. for the Intermountain Flora and Flora of North America projects, a number of new entities were found. These are validated below.

Eriogonum artificis Reveal, *sp. nov.* TYPE: UNITED STATES. Utah, Beaver Co.: San Francisco Mts., lower slope of Squaw Peak, 1.3 air

mi W of Squaw Peak and 3.4 air mi SW of Frisco, 1.2 mi S of Utah Hwy. 21, associated with *Ephedra*, *Grayia*, and *Juniperus*, N38°25'11", W113°18'00", T27S, R13W, sec. 34 center, 5925 ft elev., 14 Jul 2001, J. L. Reveal 8328. HOLOTYPE: NY. Isotypes: ARIZ, ASC, ASU, BM, BRY, CAS, COLO, GH, ID, K, MARY, MICH, MO, MONTU, OSC, RENO, RM, RSA, TEX, UC, UNLV, US, UT, UTC, WS, WTU.

A Eriogono spathulato caulis glabris cum inflorescentibus longioribus et involucris solitaris differt.

Plants erect, spreading, herbaceous perennials (2) 3–4.5 dm tall, 1–2 (3) dm across, with a short, spreading, sparsely branched caudex system arising from a woody taproot; *leaves* basal or sheathing up the stem 1–3 cm, the leaf-blades narrowly elliptic, 2–5 cm long, (0.8) 1–1.5 (1.7) cm wide, grayish tomentose on both surfaces, the margins plane, the petioles 2.5–4 cm long, tomentose; *flowering stems* erect, 1–2 dm, glabrous except pubescent among the leaves; *inflorescences* cymose, 1–2.5 dm long, 0.5–1.5 dm wide, glabrous; *bracts* 3, scalelike, 2–3 mm long, triangular; *peduncles* commonly present at lower nodes, erect, slender, 2–10 mm long, lacking at the upper nodes; *involucre*s solitary at each dichotomy, turbinate, 3.5–4 mm long, 2–2.5 mm, glabrous, the teeth 5 (6), erect, 0.5–0.8 mm long; *flowers* ochroleucous to pale yellow, rarely yellow, 3.5–4 mm long, glabrous, the tepals monomorphic, oblong, united 1/5 their length; *stamens* exserted, the filaments 5–6 mm long, pilose basally; *achenes* light brown, trigonous, 3.5–4 mm long, glabrous.

Other specimens seen.

UNITED STATES. Utah, Beaver Co.: Squaw Peak, T27S, R13W, sec. 34, 30 Aug 1981, B. Welsh & K. H. Thorne 1302 (BRY, NY).

Eriogonum artificis (from the Latin *artificis*, meaning “artist”) is here proposed to honor Kaye Hughie Thorne, 1939–2004, the noted botanical illustrator formerly at Brigham Young University. The new species is known currently only from the type location where it occurs on sandy to somewhat gravelly, volcanic slopes in a mixed grassland and sagebrush community in association with *Juniperus osteosperma* (Torr.) Little. It

flowers from August through September. The only known population consists of several hundred individuals in a geologically restricted area of less than three acres. The new species is most closely related to *E. spathulatum* A. Gray of the subg. *Eucycla* Nutt., differing from the normal phase of that species by having glabrous flowering stems and branches and a longer (1-2.5 dm versus 0.3-1 dm) inflorescence. In addition, the involucre of Kaye's wild buckwheat are consistently solitary at each node whereas those of *E. spathulatum* are typically in clusters of mostly three to six per node. Scattered populations of *E. spathulatum* in western Utah (and especially in the nearby San Francisco Mountains) consist of plants with both tomentose and glabrous flowering stems and branches; those with glabrous stems have been recently segregated as *E. spatulatum* var. *kayae* S. L. Welsh. Such plants are restricted to rocky limestone outcrops mainly on slopes and ridges, with both glabrous and tomentose individuals intermixed, and a formal taxonomic distinction can be justified.

Eriogonum brevicaule Nutt. var. *caelitum* Reveal, var. nov. TYPE: UNITED STATES. Utah, Sanpete Co.: Wasatch Plateau, N of Horseshoe Flat at the junction of Skyline Drive and road to Clay and Olsen benches, 6 mi N of Utah Hwy. 29, about 10.2 air mi E of Ephraim, N39°22'21", W111°23'45", T17S, R5E, sec. 6 NESE¼, 10835 ft elev., 23 Aug 2001, J. L. Reveal 8352. HOLOTYPE: NY. Isotypes: BM, BRY, CAS, COLO, GH, ID, IDS, MO, OSC, RENO, RM, RSA, TEX, UC, US, UT, UTC, WTU.

A Eriogono brevicaulis var. *laxifloro* plantis caespitosis cum foliis brevioribus et inflorescentibus aequae capitatis differt.

Plants caespitose perennials 0.6–1.8 (2) dm tall, 1–2.5 dm across, forming tight, dense clumps composed of a highly branched caudex system and persistent leaf bases atop of stout, woody taproot; *leaves* basal, not sheathing up the stems, the leaf-blades narrowly oblanceolate, 0.2–5 (5.5) cm long, (0.2) 0.3–0.6 (0.7) cm wide, tomentose abaxially, thinly floccose and bright green adaxially, the margin plane but slightly

thickened, the petioles 0.5–1.5 (2) cm long; *flowering stems* scapose, erect, 0.5–1.5 dm long, densely floccose to tomentose, greenish; *inflorescences* capitate, 1–2 cm across; *involucres* 3–7 per cluster, turbinate to turbinate-campanulate, 2–3.5 (4) mm long, 2–3 (3.5) mm wide, floccose to more commonly tomentose; *flowers* yellow, 2.5–3.5 (4) mm long.

Representative specimens seen.

UNITED STATES. Utah, Emery Co.: East Mtn., 12 mi NW of Orangeville, T16S, R6E, sec. 23, 10000 ft elev., 1 Aug 1982, *Albee 5318* (UT). Sanpete Co.: Heliotrope Mtn. above Ferron Reservoir, T19S, R4E, sec. 34 SWSE $\frac{1}{4}$, 17 Jul 1981, *Atwood 8003* (ASU, BRY); Horseshoe Ridge, 10600 ft elev., 4 Aug 1913, *Becraft 430* (USFS); 1 mi NW of Willow Lake, Ferron Canyon, aspen, T19S, R5E, sec. 21, 8000 ft elev., 28 Jul 1977, *Clark 1854* (BRY); plateau S of Olsen Canyon, 9700, T17S, R5E, sec. 32, 9700 ft. elev., 12 Aug 1977, *Clark 3198* (BRY, MARY); ridge between Ferron Reservoir and Duck Creek Reservoir, T19S, R4E, sec. 13, 10400 ft elev., 12 Aug 1977, *Clark 3219* (BRY); Horseshoe, 11000 ft elev., 4 Aug 1952, *Cottam 13401* (UT); Horseshoe Summit, 3330 m elev., 17–18 Aug 1914, *Eggleston 10584* (US); Wasatch Plateau, 19 Aug 1938, *Flowers 8024* (UC); S end of Heliotrope Mtn., T19S, R4E, sec 34SE $\frac{1}{4}$ SW $\frac{1}{4}$, 10950 ft elev., 10 Jul 1989, *Franklin 6786* (BRY); S end of Wagon Road Ridge, 10000 ft elev., 18 Jul 1951, *B. F. Harrison 11856* (US); Wasatch Plateau, 1 mi E of Skyline Drive on Horseshoe Ridge, 10700 ft elev., 5 Aug 1948, *Holmgren & Holmgren 7814* (BRY, CAS, CS, DAV, DS, GH, IDS, NY, RSA, UTC, WTU); Wasatch Plateau, S of Big Horseshoe, T17S, R5E, sec. 6, 10700 ft elev., *N. H. Holmgren et al. 2404* (ARIZ, BRY, CAS, IDS, GH, NY, RSA, UC, UTC, WTU); top of Wasatch Peak [sic., Plateau], 11000 ft elev., 3 Aug 1927, *Humphrey 103* (USFS); Heliotrope Mtn., 11000, 13 Jul 1977, *M. E. Lewis 4921* (BRY, COLO); Wasatch Plateau, Heliotrope Point, 11100 ft elev., 23 Jul 1976, *M. E. Lewis 4309* (BRY, UTC); road gap to head of Reeder Canyon, 10900 ft elev., 10 Aug 1978, *M. E. Lewis 5625* (BRY); Buck Ridge, 9700 ft elev., 24 Aug 1917, *Sampson 683* (USFS); E tip of Wagon Road Ridge, 10100 ft elev., 10 Aug 1962, *J. D. Walker s.n.* (BRY); 17 mi W of Ferron, T20S, R4E, sec 33, 11000 ft elev., 13 Jul 1977, *Welsh & Clark 15384* (BRY); Wasatch Plateau, 21 mi S of Mt. Pleasant, T18S, R4E, sec. 25, 10700 ft elev., 12 Aug 1977, *S. L. Welsh et al. 16105* (BRY,

MARY). Sevier Co.: White Mtn., T21S, R4E, sec. 3, 10700 ft elev., 3 Aug 1979, *Albee 4694* (UT); White Mtn., T21S, R4E, sec. 4 SE¼, 14 mi NW of Emery, 3440 m elev., 6 Aug 1983, *Tuhy 1043* (BRY).

Eriogonum brevicaule var. *caelitum* (from the Latin *caelitus*, meaning "from heaven," alluding to the high elevation of the type locality) is restricted to the high ridge and mesa tops of the southern Wasatch Mountains mainly in Sanpete Co., Utah, at elevations from 2750-3650 m elevation. The Wasatch Plateau wild buckwheat is found on the edges of high-elevation meadows typically on exposed rock outcrops. The plants now assigned to var. *caelitum* were long included within var. *laxifolium*. (Torr. & A. Gray) Reveal. As now defined plants of var. *laxifolium* are taller, non-cespitose plants of lower elevations with longer and narrower leaves that are markedly hairy on the upper surface. The inflorescences of var. *laxifolium* are typically branched but may be capitate; populations with both conditions are rather common along the Wasatch front. Unlike the var. *nanum* (Reveal) S. L. Welsh found in the northern Wasatch Mountains, the scapes of var. *caelitum* are tomentose rather than glabrous.

Eriogonum corymbosum Benth. var. *heilii* Reveal, var. nov. TYPE: UNITED STATES. Utah, Wayne Co.: Fishlake National Forest, Thousand Lake Mts., head of Red Canyon, 0.9 air mi WSW of Saddle Pass Spring and 0.9 air mi SE of Horse Pasture, 3.8 air mi ESE of Lyman and 2.9 air mi ENE of Bicknell, on shaly slopes of the Carmel Formation, associated with *Pinus aristata*, *Heterotheca villosa*, *Theliosperma windhamii*, *Tetranuris acaulis* var. *nana*, *Cercocarpus montanus*, *Phlox*, and *Cirsium* at 9100 ft elev., N38°22'45", W111°31'21", T28S, R4E, sec. 18 NWNW¼, 1 Sep 2004, *J. L. Reveal, C. R. Broome, D. J. Clark & C. M. Groebner 8543*. HOLOTYPE: NY. ISOTYPES: ARIZ, ASU, BM, BRY, CAS, COLO, GH, MARY, MICH, MO, OSC, RENO, RSA, TEX, UC, US, UTC, WTU.

A Eriogono cormybososo var. *corymbososo* inflorescentibus capitatus, raro umbellatus, floribus glabris vel infrequenter parce pilosis differt.

Plants low sprawling subshrubs (0.25) 0.5–2 dm tall and (1.2) 2–4 dm across or, occasionally, spreading to rounded shrubs 2–4.5 dm tall and 4–9 dm across; *leaves* sheathing up the stem 1–4 cm, the leaf-blades lanceolate to elliptic or oblanceolate, 0.5–2 cm long, 3–6 (8) mm wide, densely white tomentose abaxially, tomentose to floccose and greenish adaxially, the margins entire or slightly wavy, the petioles 1–3 mm long; *flowering stems* erect, 1–3 (5) cm long or, if scapose, 3–9 cm long, tomentose to floccose; *bracts* ternate, elongate-triangular to linear, 1–3 mm long, 0.3–1 mm wide, thinly tomentose; *inflorescences* capitate and 1–1.5 cm across, or umbellate or cymose, di- or trichotomous at the nodes and 2–4 (8) cm long, 3–6 (12) cm across, the branches tomentose to floccose; *peduncles* lacking; *involucres* solitary at each dichotomy, turbinate, (2) 2.5–3.5 mm long, 1.5–2.5 mm wide, tomentose to floccose, the teeth 5, triangular, 0.4–0.6 mm long; *flowers* white to pink with dark red midribs, 2–3 mm long, glabrous abaxially, rarely with scattered pilose hairs basally and then only before anthesis, sparsely pilose and/or minutely glandular along the midrib adaxially, the tepals essentially monomorphic, oblong, connate 1/4 to 1/3 their length; *stamens* slightly exerted, 2–3 mm long, the filaments pilose basally, the anthers red or purple, oval, 0.3–0.4 mm long; *achenes* light brown, trigonous, 2.5–3 mm long, glabrous, the globose base tapering abruptly to a 3-angled beak.

Other specimens seen.

UNITED STATES. Utah, Wayne Co.: Fish Lake National Forest, Thousand Lake Mts., 3 air mi N of Bicknell, T28S, R4E, sec. 13NE¼ [sic?, 18NW¼], 9000 ft elev., 20 Jul 1980, *Atwood & Thompson 7645* (BRY); Fishlake National Forest, Thousand Lake Mts., Bristlecone Toe N of Deep Creek, NE of Indian Spring and W of Deep Creek Spring, S of Billings Pass and SW of Billings Peak, 9.4 air miles NE of Bicknell, N38°26'24", W111°25'28", T27S, R4E, sec. 25 NW¼, 9040 ft elev., 9 Sep 2004, *Clark & Groebner 1* (BRY, CAS, GH, NY, US, UTC); Capitol Reef National Park, Thousand Lake Mts., Bristlecone Flats N of Deep Creek near head of Bullberry Creek, SE of Deep Creek Spring, SE of Billings Pass and SSE of Billings Peak, 9.6 air miles NE of Bicknell, N38°26'13", W111°25'02", T27S, R4E, sec. 25 NENE¼, 8840 ft elev., 9

Sep 2004, *Clark & Groebner 2* (BRY, CAS, GH, NY, US, UTC); Capitol Reef National Park, Thousand Lake Mts., Red Cone near head and N of Bullberry Creek, E of Billings Pass and Billings Peak, ESE of Pine Spring, 10.5 air miles NE of Bicknell, N38°26'43", W111°24'09", T27S, R5E, sec. 19 NWSE¼, 8200 ft elev., 9 Sep 2004, *Clark & Groebner 3* (BRY, CAS, GH, NY, US, UTC); Capitol Reef National Park, Thousand Lake Mts., Deep Creek near Billings Pass, T27S, R4E, sec. 25 NW¼, 11 Jul 1986, *Heil 2638* (BRY, SJNM); Capitol Reef National Park, Thousand Lake Mts., upper Deep Creek near the head of Bullberry Creek, T27S, R5E, sec. 19 SW¼, 2600 m elev., 24 Jul 1987, *Heil 3558* (SJNM); Capitol Reef National Park, Thousand Lake Mts., upper Deep Creek, T27S, R4E, sec. 25 NE¼, 9000 ft elev., 28 Jul 1988, *Heil & Mietty 4648* (SJNM); Capitol Reef National Park, Thousand Lake Mts., upper Deep Creek, T27S, R4E, sec. 25 NE¼, 9000 ft elev., 28 Jul 1988, *Mietty 3321* (SJNM).

Eriogonum corymbosum var. *heilii* (named for Kenneth D. Heil, 1941–, professor of biology at San Juan College, Farmington, New Mexico), is allied to *E. corymbosum* var. *corymbosum*, differing mainly in its low, sprawling habit, smaller leaves, and capitate or umbellate inflorescences. Some of the flowers at the Deep and Bullberry creek sites have sparsely pilose hairs in early anthesis; they are consistently glabrous at the type location.

Heil's wild buckwheat is confined to the upper slopes of the Thousand Lake Mountains. It occurs with Rocky Mountain bristlecone pine (*Pinus aristata* Engelm.), elevationally well above most known population of *E. corymbosum* except some populations of var. *revelianum* (S. L. Welsh) *Reveal* which do not occur on sites dominated by bristlecone pine. At lower elevations above Bullberry Creek, but still on the white shale outcrops of the Carmel Formation where var. *heilii* occurs, the plants become larger, more shrubby, and clearly approach var. *corymbosum* in aspect. Only the plants at Red Canyon (the type location) have capitate to compact umbellate inflorescences. Elsewhere, they are compact to openly umbellate.

In addition to the associated species mentioned with the type collection, others found there and elsewhere include *Pinus ponderosa*, *Pseudotsuga menziesii* var. *glauca*, *Juniperus osteosperma*, *Eremogone fendleri*, *Physaria acutifolia*, *Oxytropis oreophila*, *Purshia tridentata*, *Shepherdia rotundifolia*, *Chrysothamnus viscidiflorus*, *Townsendia aprica*, and *Leymus salina*.

Detailed searches for additional populations of Heil's wild buckwheat by Deborah J. Clark of the National Park Service (who also serves as botanist to the Fishlake National Forest via an interagency agreement) have yet to reveal additional populations. Although the Carmel Formation, where the plant is found, is broadly exposed on Thousand Lake Mountain, shale outcrops—where the variety is confined—are rare. Plants at the type location are subject to some off-road vehicle (ORV) activity, but the Deep and Bullberry Creek sites within Capitol Reefs National Park are remote and not subject to disturbance. Each of the known populations harbors some three hundred individuals with a broad range of age-classes present.

Eriogonum corymbosum Benth. var. *nilesii* Reveal, var. nov. TYPE: UNITED STATES. Nevada, Clark Co.: Muddy Mts., White Basin area, W of West Longwell Ridge, 4.2 air mi NW of Bitter Spring and 15.4 air mi SW of Overton, 2.7 mi N of American Borax Road in an unnamed side wash associated with *Larrea*, *Ambrosia*, and *Atriplex*, N36°20'15", W114°33'09", T18S, R66½E, sec. 31 SE¼, 2140 ft elev., 4 Oct 2002, J. L. Reveal 8380. HOLOTYPE: NY. Isotypes: ARIZ, ASC, ASU, B, BM, BRY, CAS, COLO, CTES, GH, ID, K, MARY, MICH, MO, MONTU, OSC, RENO, RM, RSA, SJCC, TEX, UC, UNLV, US, UTC, WTU.

A Eriogono corymboso var. *glutinoso foliis lanatis* differt.

Plants open to somewhat spreading or rarely slightly roundish perennial shrubs, 0.3–1.2 m tall, 0.4–2.3 m across; *leaves* elliptic to oblong, 0.8–2.5 (3) cm long, 0.4–0.8 cm wide, white lanate to densely white tomentose abaxially, silvery-floccose adaxially, the petioles 0.3–1.5 cm long; *inflorescences* 0.2–2 dm long, compact to open, floccose;

involucres 1.5–2 mm long, 1–1.5 mm wide; *flowers* yellow to pale yellow, rarely white, 2–3 mm long, the tepals slightly dimorphic.

Representative specimens seen.

UNITED STATES: Arizona, Mohave Co.: Pierce Wash, T41N, R11W, sec. 3, 3000 ft elev., 13 Sep 1978, *Gierisch 4506* (ARIZ). Nevada: Clark Co.: Sunset Road at Whitney Mesa, Las Vegas, 15 Sep 1980, *G. T. Austin s.n.* (BRY, MNA); 2 mi NE of Gold Butte, 3500 ft (1067 m), 27 Sep 1985, *Bechtel & Verchick s.n.* (MNA); near McCarran Airport, 14 Aug 1970, *Bourde s.n.* (ASC); University of Nevada campus, Las Vegas, 2800 ft elev., 23 Oct 1970, *Christensen s.n.* (UNLV, UT); Patrick Land and Maryland Parkway, Las Vegas, 2000 ft elev., *Knight 2003b* (BRY, MNA, NY); Longwell Ridge, Muddy Mts., T18S, R67E, sec. 30, 650 ft elev., 15 Oct 1999, *Niles et al. 6214* (NY); 1 mi N of Craig Road, w side of I-15, North Las Vegas, T20S, R62E, sec. 31, 1930 ft (588 m), 15 Oct 1999, *Niles et al. 6218* (RENO); S of Corn Creek Wash, W of North Decater Boulevard, T19S, R61E, sec. 7 NE¼ and sec. 8 NW¼, 2300 ft elev., 4 Oct 2002, *Reveal & Glenne 8379* (ARIZ, ASC, ASU, BM, BRIT, BRY, CAS, COLO, GH, ID, K, KANU, MARY, MICH, MO, NY, OSC, RENO, RM, RSA, SJCC, TEX, UC, UNLV, US, UTC, WTU).

Eriogonum corymbosum var. *nilesii* (for Wesley Everett Niles, 1939–, associate professor and curator of the herbarium at the University of Nevada at Las Vegas) is a widely scattered variety found primarily on the Mojave Desert of southern Nevada. The Las Vegas wild buckwheat has traditionally been assigned to the Colorado Plateau variant, var. *glutinosum* M. E. Jones, but differs in its white lanate to densely white tomentose leaves and disjunct distribution. A population from the flood plain of the Paria River in Kane Co., Utah, might be var. *nilesii* but remains to be studied in the field.

Eriogonum douglasii Benth. var. *elkoense* Reveal, var. *nov.* TYPE: UNITED STATES. Nevada, Elko Co.: Sunflower Flat, S side of U.S. Forest Service Road 930, 0.8 mi E of U.S. Forest Service Road 931 (McDonald

Creek Road), 1.4 air mi ESE of Point of Rock and approximately 11 air mi SE of Mountain City, associated with *Artemisia nova* and various grasses, N41°46'24", W115°46'06", T44N, R55E, sec. 28 NE¼, 6550-6600 ft elev., 30 Jun 2001, *J. L. Reveal 8315*. HOLOTYPE: NY. Isotypes: ASU, BM, BRY, CAS, COLO, GH, MARY, MO, OSC, RENO, RM, RSA, TEX, UC, US, UTC, WTU.

A Eriogono douglasii var. *douglasii* foliis lanatis differt.

Plants matted; *leaf-blades* elliptic, densely lanate on both surfaces, sometimes slightly less so and faintly greenish adaxially, the margins plane; *flowers* cream or ochroleucous, 5–8 mm long, sparsely villous.

Other specimens seen.

UNITED STATES. Nevada, Elko Co.: Jarbidge Range, 5 air mi NE of Wildhorse State Park along U.S. Forest Service Road 929, T44N, R55E, sec. 2, 6920 ft elev., 29 Jun 1995, *Curto & Smith 1455* (MNA, NY, UTC); Sunflower Flat, 1.3 air mi NE of Point of Rocks along U.S. Forest Service Road 931, T45N, R55E, sec. 21, 6500 ft elev., 30 Jun 1995, *Curto & Smith 1457* (UTC); N of Sunflower Flat, near Bieroth Spring, T45N, R55E, sec. 14, 6700 ft elev., 18 Jul 1980, *Williams & Tiehm 80-210-5* (CAS, NY, RENO); Chipman Meadow, 1.3 air mi NE of Point of Rock, along U.S. Forest Service Road 931 (McDonald Creek Road), NW of Sunflower Flat, T44N, R55E, sec. 21, 30 Jun 2001, *Reveal 8313* (BRY, CAS, MARY, NY, RENO, UC, US, UTC).

Eriogonum douglasii var. *elkoense* is known only from the Sunflower Flat area northeast of Wild Horse State Park in Elko Co., Nevada. The Sunflower Flat wild buckwheat is well isolated from the nearest populations of var. *douglasii* in north central Oregon, and populations of var. *meridionale* Reveal that occur only along the western edge of Nevada.

Eriogonum douglasii Benth. var. *meridionale* Reveal, var. *nov.* TYPE: UNITED STATES. California, Plumas Co.: Squaw Valley at the road junction of Forest Service roads 28N01 and 28N70 on flat W of road, 11.9 air mi NNW of Beckwourth, associated with *Artemisia nova*, *Purshia*

tridentata, and *Eriogonum umbellatum* var. *nevadense*, N39°59'28", W120°24'21", T.25N, R14E, sec. 27 NWSW¼, 5600 ft elev., 25 Jun 2002, *J. L. Reveal 8361*. HOLOTYPE: NY. Isotypes: ARIZ, BRY, CAS, COLO, CPH, GH, HSC, MARY, MICH, MO, OSC, RENO, RM, RSA, TEX, UC, US, UTC, WTU.

A Eriogono douglasii var. *elkoense* floribus brevioribus (4–5 mm nec 5–8 mm longis).

Plants matted; *leaf-blades* broadly elliptic to spatulate, densely grayish lanate on both surfaces, plane; *flowers* yellow or ochroleucous to rose-red, 4–5 mm long, densely villous.

Representative specimens seen.

UNITED STATES: California: Lassen Co.: between Aspen Flat and Red Rock Lookout, Diamond Mtn., 7380 ft elev., 24 Jun 1997, *Oswald & Ahart 8639* (JEPS); S of Johnstonville, 4350 ft elev., 13 Jun 1943, *Ripley & Barneby 5712* (CAS); 14 air mi NE of Ravendale, 5700 ft elev., 7 Jun 1988, *Schoolcraft 1812* (UC). Modoc Co.: S of Warren Peak, Warner Mts., 1 Aug 1932, *Applegate 8019* (DS); Lake City Mtn., Jun 1898, *Bruce 2315* (UC); N of Parker Creek, Warner Mts., 26 Jun 1932, *Payne 605* (JEPS). Nevada Co.: 5.2 mi N of Boca on the Stampede Dam Road, 5800 ft elev., 12 May 1972, *Howell & True 7128* (CAS). Plumas Co.: turnoff of Marble Lane and Co. Rd.A-23, T22N, R14E, sec 13 SW¼, 4888 ft elev., 27 May 1989, *Harnach & Harnach 119* (RENO); ridge E of Red Clover Valley, 4 Jul 1907, *Heller & Kennedy 8717* (BKL, CAS, DS, F, GH, ILL, IND, MO, TEX); along the road N of Conklin Park above Willow Creek, 0.8 mi S of U.S. Forest Service Road 27N25, T26N, R14E, sec. 26, 5750 ft elev., 25 Jun 2002, *Reveal 8362* (MARY, US); 3.75 mi NE of Beckwith Butte, 4900 ft elev., 4 Jun 1935, *Sawyer 61* (UC). Sierra Co.: 1.5 mi NW of Sierraville along California Hwy. 89, 5000 ft elev., 13 Jun 1962, *Breedlove 3509* (CAS, DS); Newman Point, T21N, R14E, sec. 25 NE¼, 5000 ft elev., 7 May 1989, *Harnach & Harnach 60* (RENO); Webber Lake, sin date, *Lemmon s.n.* (JEPS); 4 mi NE of Loyalton, 1750-1800 m elev., 22 May 1937, *Stebbins & Jenkins 2127* (UC). Siskiyou Co.: 1 mi NE of Buckhorn, 17 Jul 1986,

Heckard et al. 6544 (JEPS), N side of Black Mtn., 6800 ft elev., 8 Jul 1935, *Hitchcock & Martin 5304* (BRY, CAS, DS, GH, OKL, POM, UC, UTC, WTU). Nevada, Washoe Co.: 8 mi SW of Reno on the Hunter Creek Road, 24 Jun 1938, *Archer 6117* (ARIZ, GH, RENO, WIS/LCU); Ecology Canyon, 3.5 mi N of Reno on U.S. Hwy 395, 16 May 1950, *Bandoni 29* (RENO); N side of Hunter Creek road, 8 mi SW of Reno, 12 May 1937, *Breene 24* (RENO); S side of Hunter Creek, 6 mi SW of Reno, 13 May 1937, *Breene 46* (RENO); Ecology Canyon, 3.5 mi N of Reno, 5000 ft elev., 23 Apr 1947, *D. Brown s.n.* (RENO); N of Reno, 1906, *Frandsen s.n.* (RENO); E side of Peavine Mtn., 15 Jun 1901, *Heizer 315* (NESH, RENO); Peavine Mtn., 22 Jun 1909, *Heller 9756* (DS, GH, NESH); 5 mi W of Reno on Hunter Lake Road, 25 May 1937, *Henrichs 82* (RENO); Dinsmore Camp, Hunter Creek Canyon, 20-25 Jun 1907, *P.B. Kennedy 1637* (NESH); 6 mi W of Reno, 5800 ft elev., 23 Apr 1959, *Schank s.n.* (RENO); 5 mi N of Reno on US Hwy 395, to the left of highway on Peavine Mtn., 5000 ft elev., 23 Apr 1959, *W. Short 26* (RENO); 3 mi N of Reno on US Hwy 395, 1 mi W on a high ridge, T19-20N, R 19E, 4500 ft elev., 25 Apr 1959, *Sloan 11* (RENO); Virginia Mts., 0.5 mi E of Spanish Fork Road along road to Lower Scott Spring, T25N, R20E, sec. 18, 6850 ft elev., 28 May 2002, *Tiehm 13869* (ARIZ, NY, RENO, 12 duplicates to be distributed); NW side of Peavine Mtn. just beyond Martin's Meadow, 6000 ft elev., 28 May 1972, *M.J. Williams 72-37-4* (RENO); E side of Peavine Mtn., hill W of N Virginia Street and SE Black Springs, 5220 ft elev., 20 May 1973, *M.J. Williams & E. McPherson 73-8-3* (RENO).

Eriogonum douglasii var. *meridionale* (from the Latin *meridionalis*, for "southern") has long been confused with the more northern var. *douglasii* of north central Oregon and central Washington. The southern wild buckwheat is found primarily in northeastern California, but extends from southern Washoe Co., Nevada, northward to southern Jackson Co., Oregon. The plant just enters the Intermountain Region near Pyramid Lake north-northeast of Reno. None of the varieties of *E. douglasii* overlap in their distributions.

Eriogonum evanidum Reveal, *sp. nov.* TYPE: UNITED STATES. California: San Bernardino Co.: Bear Valley, San Bernardino Mts., 5

Aug 1902, *L. Abrams* 2894. HOLOTYPE: NY. Isotypes: C, CAS, F, GH, MIN, MO, NEB, NY, P, POM, UC, WTU.

A Eriogono folioso caulis erectis et bractis minutis differt.

Plants erect annual herbs 1–2 dm tall; *leaves* basal, the leaf-blades broadly ovate to orbicular or reniform, 0.7–1.2 cm long and wide, densely white tomentose abaxially, floccose and greenish adaxially, the margins plane, the petioles 0.5–1.5 cm long, tomentose; *flowering stems* erect, 3–6 cm long, tomentose to floccose; *inflorescences* narrowly cymose, 0.5–1.5 dm long, tomentose to floccose; *bracts* 3, scalelike, 0.5–2 mm long, 0.5–1 mm wide, triangular, floccose abaxially, glabrous adaxially; *peduncles* lacking; *involucres* solitary at each dichotomy, campanulate, 1–2 mm long and wide, glabrous except for a few scattered hairs on the rim in some, the teeth 5, spreading, 0.4–0.8 mm long; *flowers* ochroleucous, 0.8–1.2 mm long, glabrous, the tepals dimorphic, those of the outer whorl ovate and weakly hastate, those of the inner whorl lanceolate to narrowly elliptic, connate about $\frac{1}{4}$ of their length; *stamens* included, the filaments 0.4–0.6 mm long, glabrous, the anthers oval, 0.3–0.4 mm long; *achenes* dark brown, trigonous, 1.3–1.5 mm long, glabrous, abruptly tapering to a slightly 3-angled beak.

Other specimens seen.

UNITED STATES. California, Riverside Co.: Hemet Valley, San Jacinto Mts., 4600 ft elev., 10 Oct 1967, *Ziegler s.n.* (GH, RSA, UC, UTC). San Bernardino Co.: San Bernardino Mts., Bear Valley, 3 Aug 1901, *Abrams* 2087 (DS, NY, POM); Metcalf Bay, Big Bear Lake, 6800 ft elev., 29 Jul 1929, *Ewan* 1494 (RM); flat above Big Bear Lake, 29 Sep 1927, *Hoffmann* 2954 (JEPS); Baldwin Lake, 23 Sep 1927, *M. E. Jones s.n.* (POM); Baldwin Lake, 17 Aug 1929, *M. E. Jones* 24824 (MIN, POM); SW slope of Baldwin Lake, 6800 ft elev., 23 Aug 1929, *Pierson* 8587 (RSA); S of Peter Pan Woodland Club, Bear Valley, 7000 ft elev., 5 Oct 1929, *Pierson s.n.* (POM); Bear Valley, Aug 1900, *Shaw & Illingsworth* 124 (DS); between Big Bear and Baldwin Lake, 6750 ft elev., 7 Sep 1931, *Templeton* 1588 (BRY, KANU, NY). San Diego Co.: Pine Valley, 23 Oct 1893, *Alderson* 339 (DS); Pine Valley, 25 Oct 1930,

Fosberg S4143 (SD, mixed with *E. gracile*); Pine Valley, 2 Sep 1938, *Gander 6450* (SD); San Diego, 1883, *Parry s.n.* (ISC). MEXICO: Baja California: Lower California, 1884, *Orcutt s.n.* (ARIZ, MO, NY).

This distinctive species has been hidden quietly under *Eriogonum foliosum* S. Watson awaiting the rediscovery of an extant population so that it might be more precisely characterized than possible from dried material. None has been found and so it is described from a widely distributed collection. *Eriogonum evanidum* (from the Latin *evanidus*, meaning “vanishing” or “disappearing”) differs from *E. foliosum* and *E. hastatum* Wiggins, both restricted to Baja California, in being an erect (not sprawling) plant with scalelike (not foliaceous) inflorescence bracts. The flowers of the vanishing wild buckwheat are more like those of *E. foliosum* than *E. hastatum*, as the outer tepals are only weakly hastate basally. Furthermore, the basal leaves of *E. evanidum* are broadly ovate to orbicular or reniform, where those of the Mexican endemics are elliptic.

Eriogonum heermannii Durand & Hilg. var. ***subspinosum*** Reveal, var. **nov.** TYPE: UNITED STATES. Utah, Washington Co.: Beaver Dam Mts., along the power line road above Bull Dog Pass on limestone outcrops, T43S, R17W, sec. 18, 6 May 1986, *Atwood 12168*. HOLOTYPE: NY. Isotypes: BRY, UTC.

A *Eriogono heermannii* var. *sulcato* ramis laevis et a var. *humile* ramis spinosis differt

Plants low, rounded shrubs, 1–3 dm high, 1.5–5(–8) dm across; *leaf-blades* lanceolate to narrowly elliptic or spatulate, 0.5–1 cm long, 0.2–0.6 cm wide, thinly tomentose to floccose abaxially; *inflorescences* 0.3–0.7(–1) dm long, 0.3–1(–1.2) dm wide, the branches stoutish and apically spinose, glabrous and rounded but faintly grooved, with dichotomously arranged involucre; *involucre*s campanulate, 2–3 mm long, 3–4 mm wide; *flowers* yellowish-white, 2.5–4 mm long.

Other specimens seen.

UNITED STATES. Arizona, Mohave Co.: 0.7 mi NW of the rest stop in the Virgin Narrows, 28 May 1976, *Atwood 6674* (BRY, NY); Virgin Narrows along I-15, 18 May 1972, *Atwood & Higgins 3881* (BRY); Sullivan Canyon, S of the Virgin River, 1 mi W of Cedar Pocket Rest Stop along I-15, T41N, R14W, sec. 21, 2200 ft elev., 24 Apr 2000, *Atwood & Furniss 25270* (BRY, NY); near Cedar Pocket, T41N, R14W, sec. 15, 2400 ft elev., 25 May 1978, *Gierisch 4350* (ARIZ, ASC, ASU, BRY); Virgin Narrows along I-15, 6 mi E of Littlefield, 17 May 1972, *Higgins & Atwood 5312* (BRY, NY); Cedar Pockets, 2 May 1989, *N. Rogers 36* (BRY). Utah, Washington Co.: Baird Cove on the S side of Tabeau Peak, near Bulldog Knolls, T42S, R18W, sec. 28 SE $\frac{1}{4}$, 1 May 1986, *G. I. Baird & S. L. Welsh 2392* (BRY); N side of Bulldog Canyon, E end of Bulldog Knolls, T43S, R18W, sec. 21, 1050 m elev., 30 Mar 1984, *J. Chandler et al. 186* (BRY, not in flower); S side of Bulldog Knolls, T43S, R18W, sec. 28, 1000 m elev., 12 May 1984, *J. Chandler et al. 196* (BRY); SW of Bulldog Canyon, T43S, R18W, secs. 28/33, 17 May 1986, *Higgins 16550* (BRY, NY); S slope of Bulldog Knolls, T43S, R18W, sec. 28, 3400 ft., 30 Apr 1986, *S. L. Welsh & G. I. Baird 23702* (BRY, MONT, NY, RM).

Eriogonum heermannii var. *subspinosum* (from the Latin *sub-*, for “less than”, and *spinosus*, meaning “thorny”) is infrequently encountered on limestone gravelly slopes and outcrops at the southern end of the Beaver Dam Mountains in southern Washington Co., Utah, and at the eastern end of the Virgin Mountains in Mohave Co., Arizona. Its stout, spinose branches that resemble those of *Mortonia utahensis* (Coville ex A. Gray) A. Nelson, with which var. *subspinosum* is often associated, may readily distinguish it from all other varieties of *E. heermannii*. Also, unlike other members of the species, the Tabeau Peak wild buckwheat flowers in the spring of the year.

Eriogonum microthecum Nutt. var. *arceuthinum* Reveal, var. *nov.* TYPE: UNITED STATES. Nevada, Lincoln Co.: Juniper (now Mahogany) Mts., Aug 1898, *C. A. Purpus 6249*. HOLOTYPE: NY (00280684). Isotypes: DS, M, MIN, NEB, NY, POM, RM, UC, UTC).

A Eriogono microtheco var. *lapidicola* foliis et scapo persaepe glabris differt.

Plants low spreading and matted subshrubs, 0.5–0.8 dm tall, 1–1.5 dm across; *leaves* cauline, the leaf-blades linear, 5–8 (10) mm long, 0.5–1 mm wide, densely white-tomentose adaxially, sparsely floccose to much more commonly glabrous and green adaxially, the margins revolute; *flowering stems* spreading, 1–3 cm long, glabrous; *inflorescences* cymose, compact, 0.5–2.5 cm long, sparsely floccose to glabrous; *involucres* narrowly turbinate, 2–3 mm long, 1–1.2 mm wide, glabrous; teeth 5, erect, 0.5–1 mm long; *flowers* white, 1.5–2 mm long, glabrous; *achenes* light brown, trigonous, 1.5–2 mm long, glabrous.

Other specimens seen.

UNITED STATES. Nevada, Lincoln Co.: Mahogany Mts., E of Deer Lodge Canyon, 2 Jun 1983, *Shultz & Shultz 7109* (GH).

The var. *arceuthinum* (from the Greek *arkeuthinos*, meaning “of juniper”) is narrowly restricted known, seemingly, only from the Deer Lodge area of Lincoln Co., Nevada. It closely resembles both *E. microthecum* var. *lapidicola* Reveal and the weakly defined var. *phoeniceum* (L. M. Shultz) Reveal, and approaches *E. ericifolium* Torr. & A. Gray. The tightly revolute, adaxially glabrous and green leaves readily distinguish var. *arceuthinum* from all other expressions of *E. microthecum*.

The exact type location of the Juniper Mountain wild buckwheat is uncertain. I have attributed the collection to Lincoln Co., Nevada, but the original site might be in Iron Co., Utah. The sterile Shultz and Shultz collection (GH) has confused label data. The location given above does not conform to the given township and range data (T1N, R70E), the vague latitude/longitude data (37°49'N, 114°W), or where Dr. L. Shultz believes they found the plant (possibly east of Buck Mountain). Attempts to relocate the plant in the field have been unsuccessful.

Eriogonum microthecum Nutt. var. *lacus-ursi* Reveal & A. Sanders, var. nov. TYPE: UNITED STATES. California, San Bernardino Co.: Bear Valley, along south shore of Big Bear Lake just east of the northern extension of Alden Road in Big Bear Lake, on gray silty soil in conifer woodlands at 6770 ft elev., N34°14'46", W116°54'29", T2N, R1E, sec. 20 SWNW¼, 23 Jul 2001, J. L. Reveal & A. C. Sanders 8351. Holotype: NY; isotypes: BM, BRY, CAS, GH, MARY, MO, RM, RSA, UC, UCR, US, UTC.

A var. *johnstonii* foliis anguste ellipticis et revolutis, et involucri 3–4 mm longis differt.

Plants decumbent subshrubs 1.5–2 dm tall, 4–6 dm across; *leaves* narrowly elliptic, 0.7–1.5 cm long, (0.7) 1–3 mm wide, densely white tomentose abaxially, subglabrous to glabrous adaxially, the margins usually revolute; *inflorescences* 1–3 cm long, sparsely floccose to glabrous; *involucries* 3–4 mm long, glabrous or thinly floccose near base of teeth in some; *flowers* cream, 2–2.5 mm long; *achenes* 2–2.5 mm long.

Other specimens seen.

UNITED STATES. California, San Bernardino Co.: Bear Valley, Jul ----, Davidson 2284 (US); Bear Valley, 19 Jul 1900, M. E. Jones s.n. (POM); on knoll on the S shore of Bear Lake, W side of Alden Road, T2N, R1E, sec. 20NW¼, 6746 ft elev., 17 Jul 1986, Krantz s.n. (UCR); Bear Valley, Aug 1882, Parish & Parish 1512 (BM, US).

The Bear Lake wild buckwheat, *Eriogonum microthecum* var. *lacus-ursi* (from the Latin *lacus*, lake, and *ursus* bear, for the location), is known only from Bear Valley in the San Bernardino Mountains, San Bernardino Co., California (see Reveal 1971). It is restricted to a single site where there are approximately a hundred individuals. The variety is somewhat similar to the nearby var. *johnstonii* Reveal, a plant of higher elevations (2600–2900 m vs. 2050 m) that occurs in the upper reaches of the San Gabriel Mountains near the San Bernardino–Los Angeles county line. Although the flowering stems of var. *lacus-ursi* may be thinly

floccose (and thus like that of var. *johnstonii*), more often the stems are glabrous.

Eriogonum microthecum Nutt. var. *schoolcraftii* Reveal, var. nov.
 TYPE: UNITED STATES. Nevada, Washoe Co.: Seven Lakes Mtn., 3.2 mi W and N of main road to Dry Valley, just S of an ephemeral lake, associated with *Juniperus* and *Artemisia* on north-facing slope at 5675 ft elev., T24N, R18E, sec 27, 9 Aug 2002, A. Tiehm & J. Nachlinger 14053.
 HOLOTYPE: NY. Isotypes: ARIZ, ASC, ASU, B, BLMLK, BM, BRIT, BRY, CAS, CIC, COLO, CPH, CTES, DAV, GH, HSC, ID, IDS, ISC, K, KANU, LE, MARY, MICH, MO, MONTU, OSC, PE, PR, RENO, RM, RSA, S, SRP, TEX, UC, UNLV, US, UT, UTC, W, WIS, WS, WTU).

A *Eriogono microtheco* var. *ambiguo* foliis latioribus et floribus et involucri longioribus differt.

Plants roundish shrubs 3–8 dm tall, (2) 5–10 (12) dm across; *leaves* 1.5–3.5 cm long, 0.5–1.2 cm wide, densely reddish-brown tomentose abaxially, floccose adaxially, the margins plane; *inflorescences* 1–8 cm long, 5–8 cm across, floccose; *involucries* 2.5–4 mm long, floccose; *flowers* yellow, 2.5–3 mm long; *achenes* 2.5–3 mm long.

Other specimens seen.

UNITED STATES. California, Lassen Co.: 0.2 mi W of Plinco Mine Road (Lassen Co. Rd. 331), 3.5 mi E of U.S. Hwy. 395 at Doyle, 5450 ft elev., N40°01', W120°09', T.25N, R16E, sec. 14 SENW¼, 2 Aug 2002, Reveal 8370 (ARIZ, ASU, BM, BRY, CAS, COLO, GH, ID, MARY, MO, NY, OSC, RENO, RM, RSA, TEX, UC, UNLV, US, UTC, WTU); lower slopes of Wagner Canyon, T26N, R16E, sec. 19, 4600 ft elev., 20 Jul 1982, *Schoolcraft* 807 (NY); Doyle Crade Road W of Doyle, 5200 ft elev., 18 Aug 1982, *Schoolcraft* 898 (UC); Robinson Canyon W of Doyle, T25N, R16E, sec. 13, 5200 ft elev., 8 Sep 1982, *Schoolcraft* 912 (NY); slopes below McKessick Peak, ca 10 mi SE of Milford, T26N, R16E, sec. 19, 4935 ft elev., *Schoolcraft* 2945 (BRY, MARY, NY, RENO); W of The Mark Store, 6 mi SE of Milford, T26N, R15E, sec. 11, 4330 ft elev., 26 Aug 2003, *Schoolcraft* 2946 (MARY, NY); 1 mi S

of Constantia, W of U.S. Hwy. 395, T24N, R17E, sec. 13, 4662 ft elev., 8 Sep 2003, *Schoolcraft 2947* (BRY, MARY, NY, RENO); W slope of the Fort Sage Mts., 4 mi NE of Doyle, T26N, R17E, sec. 34 NE¼, 5565 ft elev., *Schoolcraft 2948* (MARY, NY, RENO); ca 3 mi NW of Constantia, 1 mi W of U.S. Forest Service Road 24N22X, T25N, R17E, sec. 32, 4650 ft elev., *Schoolcraft 2949* (MARY, NY, RENO). Nevada, Washoe Co.: Seven Lakes Mtn., N end of Red Rock Valley, T24N, R18E, sec. 21, 21 Aug 1985, *Tiehm 10226* (IDS, MONTU, MNA, NY, RM).

The var. *schoolcraftii* was brought to my attention by two Gary Dean Schoolcraft (1942– , formerly a botanist with the Bureau of Land Management) collections from Lassen Co., California, followed shortly thereafter by an Arnold Tiehm collection from Washoe Co., Nevada. It was a decade before I was able to see the plant in the field, observing it on the foothills of the Diamond Mountains near Doyle, California, just as it was coming into flower. Tiehm gathered slightly more mature material a few days later on Seven Lakes Mountain in Nevada, and Schoolcraft gathered the plant from four new locations in 2003. It is most distinctive in late flower and early fruit when the reddishness of the tomentum is most pronounced. The large, broad leaves are diagnostic.

Variation within the variety appears to be related to fire. Schoolcraft noted that the plants he observed in the Fort Sage Mountains were only 2–3 dm high where a fire had burned three years earlier. The plants were growing back from the root crown and they were not yet producing achenes. Plants at the remaining sites vary from (4) 5–10 (12) dm tall, with the majority about 8 dm, more or less matching the size of the intermixed sagebrush. The var. *schoolcraftii* is found in sagebrush communities composed primarily of *Artemisia tridentata* Nutt., *Tetradymia canescens* DC., *Ericameria nauseosa* (Pall. ex Pursh) G. L. Nesom & Baird, *Ribes velutinum* Greene, and *Ephedra viridis* Coville with nearby *Quercus kelloggii* Newberry.

The Schoolcraft wild buckwheat is allied to the other yellow-flowered expressions of *Eriogonum microthecum*, namely var. *ambiguum* (M.

E. Jones) Reveal and var. *microthecum*. The latter occurs far to the north, but the low, sprawling subshrubby var. *ambiguum* occurs on Seven Lakes Mountain (e.g., *Tiehm & Nachlinger 14054*, NY) where it remains distinct from var. *schoolcraftii*. While individual plants in some populations of var. *ambiguum* can be rather shrubby, none is as tall as var. *schoolcraftii*.

Eriogonum mitophyllum Reveal, *sp. nov.* TYPE: UNITED STATES. Utah, Sevier Co.: Along a dirt road on foothills ESE of Aurora, 1.3 mi W of Sage Flat Road, 1.1 mi W of Lost Creek, 1.6 air mi NW of Carter Peak and 4.6 air mi SW of Salina, on low ridges of Arapien Shale associated with *Atriplex* at 5350 ft elev., N38°53'46", W111°53'33", T26S, R13E, sec. 15 NWNE¼, 1 Sep 2004, *J. L. Reveal & C. R. Broome 8548*. HOLOTYPE: NY. Isotypes: ARIZ, ASC, ASU, BM, BRIT, BRY, CAS, COLO, GH, ID, K, KANU, MARY, MICH, MO, MONTU, OSC, RENO, RM, RSA, TEX, UC, UNLV, US, UT, UTC, WS, WTU.

A Eriogono ostlundii foliis lineribus differt.

Plants erect herbaceous perennials (1.5) 2–3.5 dm tall, 0.5–1 (1.5) dm across, with a short, compact caudex system arising from a stout, woody taproot. *Leaves* basal; leaf-blades linear, 1.5–6 cm long, 0.5–1 mm wide, 2–3.5 mm when forcible unrolled with the midvein about half the width, sparsely floccose and green abaxially, glabrous and green adaxially, the margin tightly revolute; petioles 0.5–1 mm long and indistinct, glabrous, the petiole base elongate-triangular, 2–3 mm long, 0.8–1.3 mm wide, glabrous except for a tuft of tomentose at the point of attachment abaxially, glabrous adaxially. *Flowering stems* erect, slender, 1–2 dm long, glabrous, light green to green. *Inflorescences* narrowly cymose, 0.5–1.5 dm long, 0.2–0.8 dm wide, the branches slender, glabrous, light green to green; bracts 3, scalelike, 1–4.5 mm, elongate-triangular, glabrous. *Peduncles* lacking. *Involucres* solitary at each dichotomy, turbinate, 2.5–4.5 mm long, 1.5–2.5(–3) mm wide, glabrous; teeth 5, erect, 0.5–0.8 mm long, the pedicels 1.5–3.5 (4) mm long, glabrous, the bractlets linear, 1–3 (3.5) mm long, minutely glandular on the edges. *Flowers* pale or greenish yellow, rarely white, becoming fused with pink

to red at least on the midveins in fruit, (2) 2.5–4 mm long, glabrous, the tepals essentially monomorphic, oblong, those of the outer whorl slightly broader than those of the inner whorl, united \square – $\frac{1}{2}$ or more of their length. *Stamens* exserted, 2.5–4 mm long; filaments glabrous or minutely pubescent basally, the anthers pale yellow, 0.3–0.4 mm long, oval. *Achenes* light brown to light reddish-brown, trigonous, 2.5–3.5 (4) mm long, exserted from the flower, glabrous, globose, tapering abruptly to a narrow, slightly 3-angled beak.

Other specimens seen.

UNITED STATES. Utah, Sevier Co.: Lost Creek, about 9 mi N of Siguard, T22S, R1W, sec. 14 SESW $\frac{1}{4}$, on Arapien Shale badlands with *Juniperus*, *Ephedra* and *Atriplex*, 5600 ft elev., 19 Sep 1995, R. Kass & K. Preston 4446 (BRY, plus two other sheets); 0.4 mi W of Sage Flat Road, 1.7 air mi N of Carter Peak and 4 air mi SSW of Salina, N38°54'01", W111°52'43", T26S, R13E, sec. 11 SWSE $\frac{1}{4}$ and sec. 14 NENW $\frac{1}{4}$, 1 Sep 2004, Reveal & Broome 8547 (ARIZ, ASC, ASU, BM, BRIT, BRY, CAS, COLO, GH, ID, K, KANU, MARY, MICH, MO, MONTU, NY, OSC, RENO, RM, RSA, TEX, UC, UNLV, US, UT, UTC, WS, WTU).

Eriogonum mitophyllum (from the Greek *mitos*, meaning "thread," and *phyllos*, "leaf," as to the linear, thread-like leaf-blades) is known only Arapien Shale badlands west of Lost Creek, about four miles south of Salina, Sevier Co., Utah. The plant is locally common where it occurs, the whole of the area subject to intensive mining and ORV activity. Much of the potential habitat west of the above-cited locations has been so altered as to exclude the thread-leaf wild buckwheat. No attempt was made in 2004 to search the base of nearby foothills of Carter Peak or the search for potential sites along Lost Creek to the east and south. Nonetheless, the Kass and Preston collection was the only known prior to 2004 suggesting that the species is uncommon if not rare.

Eriogonum mitophyllum is allied with *E. ostlundii* M. E. Jones, but differs in its linear leaves, narrow, strict inflorescences with di- and

trichotomous, U-shaped branches, and its longer, pale yellow flowers. The leaf-blades are technically revolute but the fusion of the margins is so complete that only by its position and the presence of an expanded midrib can one identify the abaxially surface. The lower surface of the blade is finely but sparsely cover with a thin tomentum of white hairs. The dominant midrib remains glabrous. The only distinctly hairy portion of the leaf is the tuft of tomentum on the petiole base where it is attached to the stem.

Eriogonum prociduum Reveal var. *mystrium* Reveal, var. nov. TYPE: UNITED STATES. Oregon, Harney Co.: Cottonwood Creek, Pueblo Mts., 14 mi N of Denio, T39S, R35E, sec. 31, 4500-5000 ft elev., 14 Jun 1959, *A. Cronquist 8439*. HOLOTYPE: NY. Isotypes: GH, MICH, RSA, TEX, UTC, WS, WTU.

A Eriogono prociduo var. prociduo folius longioribus differt.

Leaves 0.7–1.5 cm long, 3–8 mm wide, floccose and greenish abaxially, the petioles 1–1.5 (1.8) cm; *scapes* 0.4–0.8 (0.9) dm long; *involucre*s 3–4 mm long; *flowers* 2.5–3.5 (4) mm long; *achenes* 2.5–3.5 mm long.

Other specimens seen.

UNITED STATES. Idaho, Owyhee Co.: War Eagle Peak, Owyhee Mts., 21 Jul 1951, *Baker 8147* (ID); War Eagle Peak, T5S, R3W, sec 9NW, 8000 ft elev., 15 Jul 1985, *Cholewa & Henderson 1200* (ID); South Mtn., T8S, R5W, sec. 10, 7780 ft elev., 4 Jul 1992, *Smithman & Smithman LS-2554* (CIC, MARY, NY). Nevada: Humboldt Co.: Santa Rosa Range, SE side of Auto Hill, NW of Buckskin Mtn., T46N, R39E, sec. 33, 6500 ft elev., 29 May 1987, *Tiehm 11128* (BRY, NY). Oregon, Harney Co.: Wild Horse Creek Canyon, E side of Steens Mts., 22 May 1929, *Applegate 5644* (DS); Pueblo Mts., Cottonwood Creek, 1.5 mi from the intersection of the Trout Creek/Field-Denio road, T40S, R34E, sec 9/10, 6000 ft elev., 10 Jun 1981, *Grimes 2086* (ASU, BRY, CAS, CIC, MARY, NY, RM, UTC, WTU); Pueblo Mts., Machine Meadow (Roschene Place), T39N, R34E, sec. 27 SWSE¼, 6000 ft elev., 22 Jul 1980, *Wright 1407* (MARY, NY); Pueblo Mts., Cottonwood Creek drainage, ca 1 mi E of

McLean Hunting Cabin along road to Ten Cent Meadow, 6000 ft elev., T40N, R34E, sec. 2 SWNE $\frac{1}{4}$, 22 Jul 1980, *Wright 1408* (BRY, MARY, NY); Pueblo Mts., ridgetop above Denio Basin, T41S, R34E, sec. 15 NW $\frac{1}{4}$, 6900 ft elev., 23 Jul 1980, *Wright 1410* (MARY); Pueblo Mts., ridgetop above Denio Basin, T41S, R34E, sec. 10 NE $\frac{1}{4}$, 7000 ft elev., 23 Jul 1980, *Wright 1411* (MARY); Pueblo Mts., ridgetop above Denio Basin, T41S, R34E, sec. 15 NESW $\frac{1}{4}$, 6800 ft elev., 23 Jul 1980, *Wright 1413* (MARY); ridge S of Cottonwood Creek, T39S, R35E, sec. 28, 4900 ft elev., 3 Jul 1982, *Wright 1662* (NY); Pueblo Mts., Machine Meadow (Roschene Place), T39N, R34E, sec. 27 SE $\frac{1}{4}$, 6000 ft elev., 26 Jun 1980, *Wright & Franklin 1356* (BRY, MARY, NY, RENO, UC); Pueblo Mts., ridgetop above Denio Basin, T41S, R34E, sec. 15 W $\frac{1}{2}$, 6900 ft elev., 11 Jun 1980, *Wright & Price 1321* (BRY, MARY, NY, RENO. Malheur Co.: W side of Mine Creek on road to Turner Ranch, N of McDermitt Creek, SE edge of Trout Creek Mts., T41S, R40E, sec. 9 SWSE $\frac{1}{4}$, 4800 ft elev., 1 Jul 1981, *Erter 4331* (MARY); 0.5 mi S of Disaster Peak Road, 18.1 mi NW of McDermitt, T41S, R40E, sec. 15 SWNW $\frac{1}{4}$, 5000 ft elev., 5 Jun 1997, *Mansfield 97-51* (CIC); Trout Creek Mts., on ridge between Oregon Canyon and Cottonwood Creek, N of Twin Butte, T39S, R40E, sec. 15 SE $\frac{1}{4}$, 7200 ft elev., 6 Jul 2001, *Mansfield 01-163* (CIC, NY); McDermitt Basin, below Opalite Mine, T41S, R40E, sec. 4, 4 Jun 1979, *Packard & Grimes 79-197* (CIC, UTC, mixed with *E. crosbyae*); McDermitt Basin, near Mine Creek, T41S, R40E, sec. 5, 4 Jun 1979, *Packard & Grimes 79-203* (CIC); 13.5 mi W of McDermitt Road on road to Disaster Peak, W side of Mine Creek, T41S, R40E, sec. 9, 5150 ft elev., 11 Jun 1984, *Tiehm 8673* (ASU, CAS, ID, MARY, NY, RM, RSA, UT, UTC, WTU).

The var. *mystrium* (from the Greek *mystrion*, meaning "small spoon," as to the size and shape of the leaves) has long been misunderstood. Most specimens of the Pueblo Mountains wild buckwheat have been termed *Eriogonum ochrocephalum* S. Watson, but that assignment was almost always with apologies. The new variety differs from typical var. *prociduum* of Modoc Co., California, Washoe Co., Nevada, and Lake Co., Oregon, in having abaxially floccose and greenish leaf-blades (not tomentose) on longer (10–20 mm versus 2–5 mm) petioles. The two

entities do not overlap in their distribution.

Eriogonum terrenatum Reveal, *sp. nov.* TYPE: UNITED STATES. Arizona, Cochise Co.: San Pedro Riparian National Conservation Area, on low eroded bluffs W of the San Pedro River, 0.4 air mi NE of Boquillas (ruins) and 1.2 air mi NW of Contention (ruins), about 4.1 air mi NNW of Fairbank and Arizona Hwy. 82, N of Presidio Santa Cruz de Terrenate (ruins), associated with *Larrea* and other desert shrubs, 3860 ft elev., N31°46'29", W110°13'20", T19S, R21E, sec. 17 SESW¼, 20 Oct 2003, J. L. Reveal, J. L. Anderson, E. Makings, & M. J. Whetstone 8417. HOLOTYPE: NY. Isotypes: ARIZ, ASC, ASU, B, BM, BRY, CAS, COLO, GH, ID, K, MARY, MICH, MO, OSC, RENO, RM, RSA, TEX, UC, UNLV, US, UTC, WTU.

A *Eriogonum pulchro* floribus longioribus (3.5–5 mm nec 1.5–2.5 mm longis) et involucris latioribus (2.5–3.5 mm nec 1–1.5 mm latis) differt.

Plants sprawling to erect woody shrubs, 1–4 (5) dm tall, (1) 2–6 (9) dm across; *leaves* cauline, fasciculate, the leaf-blades linear-oblongate or linear-elliptic, 0.3–0.8 (1) cm long (0.5) 1–2 mm wide, densely white-tomentose abaxially, thinly floccose to glabrous and green adaxially, the margin inrolled, the petioles 0.5–1 mm long, glabrous; *flowering stems* erect or nearly so, 0.5–3 cm long, thinly tomentose, green; *inflorescences* cymose, compact, 1–3 cm long, 1–3 cm wide, thinly tomentose, green; *bracts* 3, scalelike, (0.5) 1–2 mm long, triangular; *peduncles*, when present, erect, 1–8 (10) mm long, thinly tomentose; *involucre*s solitary at each dichotomy, campanulate, 3–4.5 mm long, 2.5–3.5 mm wide, thinly tomentose to subglabrous, the teeth 5, erect, 0.5–1.2 mm long; *flowers* white, 3.5–4.5 (5) mm long, glabrous, the tepals dimorphic, the outer whorl of tepals broadly cordate, 2–3 mm wide, the inner whorl of tepals oblongate, 1–2 mm wide, connate 1/3 their length; *stamens* exserted, 3.5–4.5 mm long, the filaments pilose basally; *achenes* light brown, trigonous, 4–4.5 mm long, glabrous.

Other specimens seen.

UNITED STATES. Arizona, Cochise Co.: San Pedro Riparian National Conservation Area, upper San Pedro River, southwest of old Terrenate site, associated with *Acacia neovernicosa*, *Tiquilia canescens*, *Ziziphus obtusifolia*, *Thymophylla acerosa*, *Ephedra trifurca*, *Hilaria mutica*, and *Hymenopappus filifolius* var. *pauciflorus* at 31°46.544'N, W 110°13.277'W, 1193 m elev., 10 Apr 2003, *Makings & M. Whetstone 1467* (ASU, NY - not in flower); San Pedro Riparian National Conservation Area, on low eroded bluffs W of the San Pedro River, 04 air mi NE of Boquillas (ruins) and 1.2 air mi NW of Contention (ruins), about 4.1 air mi NNW of Fairbank and Arizona Hwy. 82, N of the site of Presidio de Santa Cruz de Terrenate, associated with *Larrea* and other desert shrubs, 3856 ft elev., N31°46'29", W110°13'20", T19S, R71E, sec. 20 SESW¼, 20 Oct 2003, *Makings, et al. 1684* (ASU). Pima Co.: 8.3 mi SE of Vail exit along Interstate Hwy. 10 on shaley brown outcrops of the Pantano Formation, associated with *Juniperus*, *Acacia*, *Krameria*, *Psilostrophe*, *Menodora* and *Dyssodia* at 3520 ft elev., T16S, R17E, sec. 27 NW¼, 30 Nov 1984, *J. Anderson 84-70* (ASU, MARY) and *84-71* (ASU, MARY); 1.6 km W of Cross Hill near old Pantano Railroad siding, 0.3 km S of Marsh Station Road, and about 1 km N of Southern Pacific Railroad and Cienega Creek, T16S, R17E, sec. 27 NESE¼, 1082 m elev., 19 Aug 2002, *Duncan s.n.*, also 7 Nov 2002 (ARIZ, NY, US); N of East Marsh Station (or Pantano) Road N of Cienega Creek, 6.3 mi ENE of the Mountain View Exit (Exit 281) along Interstate Hwy. 10, 1.4 air mi NW of Cross Hill and 6.85 air mi ESE of Vail, associated with *Larrea*, 3520 ft elev., 32°01'00"N, 110°36'01"W, T16S, R17E, sec. 27 NWNW¼, 20 Oct 2003, *Reveal & Anderson 8415* (ARIZ, ASC, ASU, BRY, CAS, GH, MARY, MO, NY, RM, RSA, UC, US, UTC); S of East Marsh Station (or Pantano) Road N of Cienega Creek, 6.8 mi ENE of the Mountain View Exit (Exit 281) at Interstate Hwy. 10, 1.1 air mi WNW of Cross Hill and 7.1 air mi ESE of Vail, associated with *Larrea*, 3560 ft elev., 32°00'35"N, 110°35'58"W, T16S, R17E, sec. 27 NWSW¼, 20 Oct 2003, *Reveal & Anderson 8416* (ARIZ, ASU, BRY, NY, UC).

Eriogonum terrenatum (from the Latin *terra*, meaning "earth," and *natus*, "birth," and indirectly from the Spanish *terrenate*, "earthy," in

reference to Presidio Santa Cruz de Terrenate, see below) is known only from two disjunct populations, but is likely more widespread, especially along the San Pedro River in Cochise Co. The plant occurs on the eroded slopes of the St. David Formation above the river where it is locally common wherever the gray, alluvial outcrop is exposed. The San Pedro River wild buckwheat is a member of the *E. microthecum* Nutt. complex, and most similar to *E. pulchrum* Eastw. of the Colorado Plateau in northern Arizona. It differs from that species in being a larger, more robust shrub with campanulate (not turbinate) involucre and broadly cordate (not orbicular) tepals.

The Chihuahuan Desert population occurs in the San Pedro Riparian National Conservation Area managed by the Bureau of Land Management, and is thus afforded a degree of environmental protection. The Sonoran Desert populations near Vail, Pima Co., Arizona, incorrectly reported as *Eriogonum ericifolium* Torr. & A. Gray (Duncan & Reveal 2003), are restricted to state-owned land and are subject presently to ongoing mining and off-road activities. It is confined to the Pantano Formation.

The species epithet is taken from the name given to the Spanish Presidio Santa Cruz de Terrenate. An Irish mercenary named Hugh O'Connor selected the site along the San Pedro River above the now abandoned railhead and mill town of Fairbank in August of 1775; construction was started early in 1776. Its soldiers came from the village of Terrenate in Sonora, Mexico, but the Arizona location proved too vulnerable to attack by the Apaches, and was abandoned in 1780. Two officers and some eighty soldiers were killed over the five years of occupation (Bannon 1974; Moorhead 1975). Today, only the eroded remnants of the abode walls of various buildings remain (Negri 1997).

Eriogonum umbellatum Torr. var. *ahartii* Reveal, var. nov. TYPE: UNITED STATES. California, Butte Co.: Feather River Canyon, along California Hwy. 70 at turnoff to Pulga, N39°47'40", W121°27'11", T22N, R5W, sec. 6 NW¼, 1600 ft elev., 24 Aug 1975, J. L. Reveal 3977. Holotype: US. Isotypes: BRY, CAS, GH, MARY, MICH, MO, NY, OKL, RSA, TEX.

A Eriogono umbellato var. *polyantho* tomentosus ferrugineis differt.

Plants large, densely branched, spreading shrubs 3–8 × 5–13 dm across; *leaves* in loose rosettes, the leaf-blades elliptic to broadly elliptic or ovate, 1–2.5 (3) cm long, 0.7–1.5 cm wide, densely rusty lanate to tomentose abaxially, floccose to glabrous and olive-green adaxially; *flowering stems* erect, stout, 1–2 dm long, mostly tomentose or at least densely floccose; *inflorescences* compound umbellate, divided 3–4 times; *involucral tubes* 2.5–4 mm long, the lobes 2–3 mm long; *flowers* bright yellow, 5–8 mm long.

Representative specimens seen.

UNITED STATES. California, Butte Co.: 2.5 mi NE of Forbestown, 2900 ft elev., 15 Aug 1985, *Ahart 5164* (GH, MO); Lumpkin Ridge, 8 mi NE of Feather Falls, 3200 ft elev., 9 Jul 1985, *Ahart & Ahart 5113* (GH, MO); Margalia, 2 Aug 1938, *Hoover 3720* (UC); 2 mi W of Pulga, 19 Aug 1951, *J. T. Howell 28160* (CAS, RSA); Pulga Bridge, T22N, R5E, sec. 6, 1600 ft elev., 17 Sep 1981, *C. Taylor 4280* (CHSC, MO)

Eriogonum umbellatum var. *ahartii* (for Lowell Ahart, 1938–, California rancher, conservationist and botanical collector) is restricted to serpentine slopes in oak and pine woodlands in the Paradise area of Butte Co., California, where it is known from four sites. Ahart's sulphur flower is by far the most elegant member of the species and is worthy of widespread cultivation. It is most closely related to var. *polyanthum* (Benth.) M. E. Jones.

Eriogonum umbellatum Torr. var. *canifolium* Reveal, var. nov. TYPE: UNITED STATES. California, Tulare Co.: Sierra Nevada, Sherman Pass Road, 0.4 mi above junction of Rattlesnake and Woodpecker trails, 3.5 mi E of Paloma Meadows and 9.2 mi E of Sherman Pass, on modified granitic soil with *Artemisia*, *Purshia* and conifers, N36°01'40", W118°16'35", T.22S, R34E, sec.11 NE¼ of the SW¼, 8400 ft elev., 16 Jul 2001, *J. L. Reveal 8342*. HOLOTYPE: NY. ISOTYPES: ASU, BM, BRY, CAS, COLO, GH, MARY, MO, OSC, RENO, RM, RSA, TEX, UC, US, UTC, WTU.

A Eriogono umbellato var. *nevadense* foliis lanatis differt.

Plants low mats 3–10 dm across; *leaves* in rather tight rosettes, the leaf-blades elliptic, 0.4–2 cm long, 0.3–0.7(–0.9) cm wide, densely grayish lanate on both surfaces or tomentose and grayish to greenish adaxially, rarely thinly floccose to glabrous on individual leaf-blades; *flowering stems* erect, slender, (0.5–)1–1.8(–2) dm long, tomentose; *inflorescences* umbellate, the branches 1–2.5(–4) cm long, tomentose to floccose; *involucral tubes* 2–3 mm long, the lobes 2–3.5 mm long; *flowers* bright yellow, (4–)5–7(–8) mm long.

Representative specimens seen.

UNITED STATES. California, Inyo Co.: South Fork of Big Pine Creek, 8000 ft elev., 13 Jul 1941, *Alexander & Kellogg 2544* (RM). Los Angeles Co.: ENE of Sawmill Campground, Liebre Mts., T17N, R16W, sec 14 & 15, 5160 ft elev., 23 Jun 1994, *Ross & Boyd 8053* (BRY). San Bernardino Co.: Stockton Flats, head of Lytle Creek Canyon, San Bernardino Mts., 15 Jul 1937, *Roos 355* (ASU). Tulare Co.: pass at the head of Dark Canyon, Kern Plateau, 8075 ft elev., 26 Jun 1968, *Twisselmann 14405* (BRY, CAS).

Eriogonum umbellatum var. *canifolium* (from the Latin *canus*, meaning “gray,” and *folius*, “leaf”) is infrequently found in the southern Sierra Nevada of Inyo and Tulare counties, California, and in the Argus Mountains to the east. It also occurs in the Transverse Ranges of western Los Angeles Co. The densely lanate leaf surfaces and the low, matted habit of the Sherman Pass sulphur flower are distinctive features especially when compared with the more commonly encountered var. *nevadense* Gand. of the Sierra Nevada. As the plants mature the amount of tomentum on the upper surface of the leaf-blades thins and individual blades can become floccose or even glabrous.

Eriogonum umbellatum Torr. var. *lautum* Reveal, var. nov. TYPE: UNITED STATES. California, Siskiyou Co.: Scott Valley, along South Kidder Creek Road 0.5 mi WSW of California Hwy. 3, about 6.1 air mi SW of Fort Jones and 5.7 air mi N of Etna, on gravelly soil in open grasslands, N43°32'20", W122°54'54", T.43N, R9W, sec. 30 NENE¼,

2850 ft elev., 19 Jul 2001, *J. L. Reveal 8348*. HOLOTYPE: NY. Isotypes: BRY, CAS, GH, HSC, MARY, MO, OSC, RENO, RM, RSA, UC, US, UTC.

A Eriogono umbellato var. *polyantho* plantis tegetes, a var. *goodmanii* inflorescentibus nec divisis, et a var. *modocense* foliis lanatis abaxialibus differt.

Plants low spreading mats 3–10 dm across; *leaves* in rather loose rosettes, the leaf-blades elliptic, (1) 1.5–4 cm long, (0.5) 0.8–1.8 (2) cm wide, densely white tomentose to lanate abaxially, white tomentose and greenish or, rarely, floccose or even glabrous adaxially; *flowering stems* erect, stoutish, 1–2 dm long, tomentose; *inflorescences* compound umbellate, 3–10 (12) cm long, divided 2–3 times; *involucral tubes* (3) 3.5–5 mm long, the lobes (3) 4–6 mm long; *flowers* bright yellow, 4–7 mm long.

Other specimens seen.

UNITED STATES. California, Siskiyou Co.: Scott Valley, Etna Creek, 1.5 mi from Etna, 2940 ft elev., 2 Aug 1948, *Parker 161* (DS, RSA, UC); Scott Valley, 1 mi E of Etna, 2900 ft elev., 16 Sep 1949, *Tracy 18562* (TEX, UC).

Eriogonum umbellatum var. *lautum* (from the Latin *lautus*, meaning “neat” or “elegant”) is restricted to sandy or gravelly flats in oak and conifer woodlands in the Scott Valley area of Siskiyou Co., California. It is allied to var. *polyanthum* (Benth.) M. E. Jones, but is a low spreading mat rather than an erect, more or less open shrub. The Scott Valley sulphur flower is also related is var. *goodmanii* Reveal and to a lesser degree var. *modocense* (Greene) S. Stokes, both matted perennials but with simple, umbellate inflorescences. This elegant plant deserves a place in the horticultural trade.

Eriogonum umbellatum Torr. var. *mohavense* Reveal, var. *nov.* TYPE: UNITED STATES. Arizona, Mohave Co.: Dixie Corridor, NE side of Wolf Hole Mtn., SW of Quail Hill, 0.1 mi W of Mohave County Road 5, 0.6 mi E of the turnoff to Seegmiller Mtn., in pinyon-juniper woodlands,

N36°49'29", W113°34'19", T40N, R12W, sec. 34 NESW¼, 5100 ft elev., 21 May 2003, *J. L. Reveal 8384*. HOLOTYPE: NY. Isotypes: ARIZ, ASC, ASU, BRY, CAS, COLO, GH, MARY, MO, RENO, RM, RSA, UC, UNLV, US, UTC.

A Eriogono umbellato var. *subarido* plantis tegetes nec fruticosis differt.

Plants mostly low, spreading mats 1–3 dm across; *leaves* in rather tight rosettes, the leaf-blades elliptic, 0.7–2.5 cm long, 0.3–1 cm wide, thinly floccose and greenish on both surfaces or glabrous and green adaxially; *flowering stems* erect or nearly so, (0.3) 0.5–1.5 (2) dm long, thinly floccose to nearly glabrous; *inflorescences* umbellate, (0.2) 0.3–1 dm long, thinly floccose to nearly glabrous; *involucral tubes* 2–3 mm long, the lobes 1.5–3 mm long; *flowers* bright yellow, 3–7 mm long.

Representative specimens seen.

UNITED STATES. Arizona, Mohave Co.: 19 mi S of Virgin River bridge along Hwy 64, 26 May 1969, *Atwood 1731* (BRY); Andrus Canyon, 30 mi S of Mt. Trumbull Village, T32N, R11W, sec. 1, 12 Jun 1983, *Atwood 9417* (BRY); Jump Canyon, SE of Black Rock Mtn., T37N, R13W, sec. 16 NE¼, 15 May 1985, *Atwood 10986* (BRY); junction of Mud Spring/Pacoon Ranch roads, T38N, R14W, sec. 25, 12 May 2000, *Atwood 25603* (BRY, MNA, NY); Road Canyon, T38N, R13W, sec. 20/21, 11 May 2000, *Atwood 25635* (BRY, NY, SJNM); 13.6 mi S of I-15 on Black Rock Road, T40N, R13W, sec. 14, 22 May 2001, *Atwood 27480* (BRY); E base of Black Rock Mtn., 18 May 1982, *Atwood & Higgins 3910* (BRY); Maple Canyon, 1 mi N of Little Wolf Pass, T39N, R13W, sec. 16, 5000 ft elev., 18 May 1989, *Baird 3079* (BRY); 5.2 mi SW of Wolf Hole along AZ Hwy 64, T38N, R12W, sec. 16 NW¼, 5000 ft elev., 30 Apr 1978, *Brown & Parfitt 430* (ASU – in bud); E base of Wolf Hole Mtn., near Wolf Hole Spring, T39N, R12W, sec. 21, 5200 ft elev., 20 May 1978, *Brown & Parfitt 733* (ASU); 16.1 mi S of Utah line on AZ Hwy 67, 2.7 mi S of Mokaac Pass, W side of Seegmiller Mtn., T39N, R12W, sec. 11, 4300 ft elev., 9 Jun 1978, *Coombs & Bundy 2499* (ARIZ, ASU, BRY); between St. George and Wolf Hole, near junction of BLM roads 1069 and 1038, SE of Wolf Hole Mtn., 5200 ft elev., 18 Apr

1993, *Christy 1411* (ASU – in bud); 15.8 mi S of I-35 on road to Black Rock Mtn., 24 May 1986, *Grimes & Meurer-Grimes 2938* (BRY); SW of Seegmuller Mtn., T39N, R12W, sec. 17, 5000 ft elev., 26 May 1998, *Higgins 19584* (BRY); Wolf Hole Valley, T39N, R12W, sec. 26, 27 May 1999, *Higgins et al. 20287* (BRY, NY); Black Rock Gulch, T39N, R13W, sec. 10, 1500 m, 15 May 2000, *Higgins 21316* (BRY); Black Rock Gulch, T40N, R13W, sec. 35, 1450 m, 10 May 2001, *Higgins 22861* (BRY); 1 mi NW of Mollie's Nipple, T21N, R10W, sec. 8, 23 May 2001, *Higgins 23059* (BRY); Wolf Hole Mtn., 0.2 mi W of Mokiah Pass, 5000 ft elev., 22 May 1969, *Holmgren 3292* (BRY, C, COLO, IDS, ILL, KANU, MIN, NY, OKL, RSA, US); NE side of Wolf Hole Mtn., T40N, R12W, sec. 34, 5200 ft elev., 24 May 2001, *Holmgren & Holmgren 14271* (NY); Pocum Wash, ca 18 mi W of Wolf Hole, near Cane Spring, 8 Jun 1968, *Mason et al.*, 2833 (ARIZ); without location, 1877, *Palmer 426* (MIN, MO, NY); between Seegmuller and Wolf Hole mts., T40N, R12W, sec. 34, 5040 ft elev., *Reichenbacher & Wilson 1725* (ARIZ, ASU).

Eriogonum umbellatum var. *mohavense* is restricted to sandy or more commonly dark, volcanic, gravelly flats and slopes in sagebrush communities, and in oak, pinyon-juniper and montane conifer woodlands in the Black Rock and Wolf Hole mountains of Mohave Co., Arizona. The var. *mohavense* flowers in late spring and early summer, well before its nearest relative, the late summer and fall flowering var. *subaridum* S. Stokes. The Mohave sulphur flower flowers even earlier than the var. *vernum* Reveal of central Nevada. The compact caudex system and the long inflorescence branches (2–8 cm long) of the simple, umbellate inflorescence readily distinguishes the new variety from all other expression of *E. umbellatum* in the area.

Eriogonum umbellatum Torr. var. *nelsoniorum* Reveal, var. nov. TYPE: UNITED STATES. California, Humboldt Co.: Along U.S. Forest Service Road 1 at S end of Whiting Ridge, about 0.5 air mi WNW of High Salt Ground and 9.3 air mi W of Hyampom, on serpentine outcrops in an open grassland at 4250 ft elev., N40°37'36", W123°37'50", T.3N, R5W, sec. 20 NWSE¼, 18 Jul 2001, *J. L. Reveal 8345*. HOLOTYPE:

NY. Isotypes: BM, BRY, CAS, COLO, GH, MARY, MO, OSC, RENO, RM, RSA, UC, US, UTC, WTU.

A Eriogono umbellato var. *bahiiiforme* inflorescentibus nec divisis differt.

Plants low spreading mats or subshrubs up to 7 dm across; *leaves* in rather loose rosettes, the leaf-blades elliptic to oblong, (0.5) 1–1.5 (2) cm long, 0.4–0.8 cm wide, densely white tomentose to lanate abaxially, to floccose and greenish or, rarely, glabrate and green adaxially; *flowering stems* erect, stoutish, 1–2 dm, thinly floccose; *inflorescences* umbellate, 1–3 cm long; *involucral tubes* 3–4 mm, the lobes 2–4 mm long; *flowers* bright yellow, (5) 6–7 mm.

Representative specimens seen.

UNITED STATES. California, Humboldt Co.: North Trinity Mtn., T8N, R6E, sec. 3, 6100 ft elev., 3 Aug 1973, *Klipfel 300* (HSC); along U.S. Forest Service Road 1 NW of Grouse Mtn. at milepost 14.3, ca 10.3 air mi SW of Salyer, N40°45'51", W123°41'29", T5N, R4E, sec. 35 SWSE¼, 4500 ft. elev., 18 Jul 2001, *Reveal 8346* (BM, BRY, CAS, COLO, GH, MARY, MO, NY, OSC, RENO, RM, RSA, TEX, UC, US, UTC, WTU); along U.S. Forest Service Road 1 near White Rock Springs at milepost 7.8, ca 7.8 air mi SW of Salyer, N40°48'51", W123°41'49", T5N, R4E, sec. 14 NESE¼, 4900 ft. elev., 18 Jul 2001, *Reveal 8347* (BRY, CAS, MARY, MO, NY, OSC, RSA, UC); Trinity Summit, head of Devil's Hole, 6000 ft elev., 28 Jul 1935, *Tracy 14328* (UC). Trinity Co.: top of Seven-up Pass, T36N, R9W, sec. 27, 7500 ft elev., 9 Jul 1975, *Di Tomaso 113* (DAV); saddle between North Yolla Bolly Mtn. and Black Rock Mtn., T27N, R10W, sec. 15, 7100 ft elev., 39 Jun 1974, *Lester 334* (HSC); Mt. Lassie (Signal Peak), T1S, R5E, sec. 36, 5872 ft elev., 10 Jul 1973, *T. W. Nelson 1032* (HSC, RSA); 1 mi SE of Mud Spring, T29N, R11W, sec. 19, 4600 ft elev., 21 Aug 1980, *M. S. Taylor 3295* (MO).

Eriogonum umbellatum var. *nelsoniorum* (named for the collecting team of Thomas W. Nelson, Jr. and Jane P. Nelson, experts on the serpentine flora of northern California; formerly associated with

Humboldt State University [now California State University Humboldt]) is found in widely scattered locations on sandy to gravelly serpentine slopes and ridge tops of the northern coastal ranges in oak and montane conifer woodlands in Humboldt and Trinity counties, California. There appears to be a disjunct population on the eastern Scott Bar Mountains of Siskiyou Co. The var. *nelsoniorrum* is somewhat akin to var. *argus* Reveal but probably more closely related to var. *bahiiforme* (Torrey & A. Gray) Jepson. It differs from both in consistently having a simple, rather than compound umbellate inflorescence. The large bracts that subtend the umbel of Nelson's sulphur flower are long (1–1.5 cm) and foliaceous, like those of var. *bahiiforme*, but the distribution of tomentum of the leaves is like that found in var. *argus*.

Eriogonum umbellatum Torr. var. ***ramulosum*** Reveal, var. nov. TYPE: UNITED STATES. Colorado. Jefferson Co.: Along U.S. Hwy 6 adjacent to I-70, 0.4 mi E of Exit 256 to Buffalo Bill's Grave, N39°42'12", W105°14'32", T4S, R70W, sec. 18, 7100 ft elev., 25 Jul 1992, J.L. Reveal 7244. HOLOTYPE: NY. Isotypes: BRY, CAS, COLO, GH, MARY, MO, RENO, RM, RSA, UC, US, UTC.

A *Eriogono umbellato* var. *umbellato* inflorescentibus divisis differt.

Plants low, often rather compact, mats 2–4 dm across; *leaves* in loose rosettes, the leaf-blades mostly elliptic to oval, 1–2.5 cm long, 0.5–1.5 cm wide, densely white to gray tomentose abaxially, floccose and green adaxially; *flowering stems* erect, mostly 1–3 dm long, floccose; *inflorescences* compound umbellate and divided 2–3 times; *involucral tubes* 2–3 mm long, the lobes 1.5–3 mm long; *flowers* bright yellow, 4–7 mm.

Other specimens seen.

UNITED STATES. Colorado, El Paso Co.: Colorado Springs, Jul 1892, *Eastwood s.n.* (F, MO, RM); Jefferson Co.: Mt. Vernon Country Club, Golden, 7 Aug 1941, *Ehlers 8159* (COLO, MICH, TEX, WTU). Larimer Co.: Cherokee Park, 15 Jul 1934, *R. J. Davis 394-W* (IDS); Estes Park, 16 Jul 1978, *Hampton s.n.* (NY); 2.1 mi W of Drake, 9 Aug 1967, *Neal &*

Neal 2 (ASU); YMCA Camp, Estes Park, 17 Aug 1966, *Rominger 455-66* (ASC); Estes Park, Aug 1931, *E. C. Smith s.n.* (MONT); Big Thompson Canyon, 7500 ft elev., 3 Jul 1934, *S. Stokes 201a* (RM). Mineral Co.: Piedra, 12 Jul 1899, *C.F. Baker 291* (RM).

Eriogonum umbellatum var. *ramulosum* (from the Latin *ramulosus*, meaning "with small branches") is encountered mainly but infrequently along the Front Range of the Colorado Rocky Mountains mainly west of Fort Collins south to Colorado Spring and then westward to Piedra. Buffalo Bill's sulphur flower is related to var. *umbellatum*, differing consistently in having a compound umbellate inflorescence.

Eriogonum umbellatum Torr. var. *sandbergii* Reveal, var. nov. TYPE: UNITED STATES. Washington, Chelan Co.: Tumwater Canyon, 1600 ft elev., 21 Jul 1893, *J. H. Sandberg & J. B. Leiberg 521* HOLOTYPE: NY. Isotypes: C, CAN, CAS, F, MO, NY(2), US, WS.

A *Eriogono umbellato* var. *umbellato* plantis subfruticosis et foliis glabris adaxialis differt.

Plants low subshrubs to spreading woody mats, 2–6 dm across; *leaves* in loose rosettes, the leaf-blades elliptic to ovate, 1–2.5 (3) cm long, 0.5–1.5 (2.3) cm wide, densely lanate abaxially, glabrate to glabrous and bright green adaxially; *flowering stems* mostly 1–2.5 (3) dm, thinly tomentose to floccose; *inflorescences* umbellate; *involucral tubes* 2–3 mm long, the lobes 1.5–4 mm long; *flowers* bright yellow, 4–7 (8) mm.

Representative specimens seen.

UNITED STATES. Oregon, Hood River Co.: Cloud Cap Inn, NE slope of Mt. Hood, 6000 ft elev., 6 Aug 1959, *Bennett 1680* (NY). Morrow Co.: head of Little Wall Creek, 28 Jun 1937, *Umatilla Range Survey Team 36* (USFS). Wasco Co.: Marion's Point Lookout, Mount Hood, 4500 ft elev., *G. N. Jones 4106* (IDS, LA, NY, UC, UTC, WTU); summit of Bluegrass Ridge, Mount Hood, 5000 ft elev., 31 Jul 1927, *M. E. Peck 3297* (WTU). Washington, Chelan Co.: Tumwater Campground, T25N, R17E, sec. 9 SW¼, 2000 ft elev., 28 Jun 1968, *Batterson s.n.* (WS);

3 mi SE of Stuart Lake on trail to Stuart Lake, 4500 ft elev., 27 Aug 1974, *Denton 3574* (WTU); Little Grade Creek, N side of Lake Chelan, 3100 ft elev., 9 Jun 1936, *Edwards 268* (WS); Tumwater Canyon W of Tumwater Mtn., 4 mi NW of Leavenworth, N47°37.5', W120°43', 1550 ft elev., 29 Jun 1998, *Fishbein & McMahon 3510* (WS); along U.S. Hwy 2, 0.5 mi E of dam, T24N, R17E, sec. 4 SE¼, 12 Jul 1972, *Grable 4207* (WS); knoll at S end of Tumwater Canyon E of Leavenworth, 15 May 1949, *Hagen s.n.* (WTU); mouth of Tumwater Canyon, 11 Jun 1983, *Hagen s.n.* (WTU); Icicle Creek, Fourth of July Trail, 1900 ft elev., 4 Aug 1996, *Hammond 10951a* (ASC); Stehekin, Lake Chelan, 7 Jul 1911, *M. E. Jones s.n.* (DS, POM); junction of Hwy. 2 and Icicle Canyon Road, 1200 ft elev., 23 May 1964, *Kern 498* (DS, HSC, KANU, NY, UC, WS, WTU); along McCue Ridge trail below McCue Ridge Lookout, 2800 ft elev., 20 Jul 1936, *Perkins 168* (WS); Leavenworth, 3 Jul 1904, *Piper 2561* (WS); Peshastin, Jul 1893, *Sandberg & Leiberg s.n.* (MICH, MIN, NY, UTC, WS, WTU); Leavenworth, Jul 1898, *Savage et al. s.n.* (WS); Fourth of July Hill, Icicle Ridge, 2000 ft elev., 26 Jun 1931, *Seely 49* (MIN, MO, NY, WTU); near Leavenworth, 23 May 1931, *Thompson 6414* (WTU); Tronsen Ridge, 4000 ft elev., 5 Jul 1933, *Thompson 9317* (DS, MIN, MO); Stehekin, 4 Jul 1901, *Whited 1383* (WS); mountain at head of Gulch No. 1, Wenatchee, 4 Jul 1899, *Whited 1167* (WS). Kittitas Co.: 2 mi NW of Mission Peak, Wenatchee Mts., 6000 ft elev., 14 Jul 1954, *C. L. Hitchcock 20279* (NY, WTU); Bald Mtn., 5900 ft elev., 22 Jun 1940, *Thompson 14813* (CAN, CAS, DPU, MIN, MO, NY, OKL, UTC, WTU). Okanagon Co.: Little Slate Creek, T34N, R19E, sec. 27, 9 Jul 1936, *Edwards 283* (WS); road leading the Harts Pass, 27 Jul 1937, *Fiker 2376* (WS); Harts Pass Road, 3 mi from Harts Pass, 5000 ft elev., 15 Jul 1974, *Grable 5782* (WS); Yellowjacket Creek, T37N, R19E, sec. 32 SE¼, 2900 ft elev., 21 Jun 1979, *Naas & Naas 3819* (WS); Leavenworth, Jul 1898, *Savage et al. s.n.* (F, IA, MO, RENO); Methow River, Twisp, 17 Jul 1921, *St. John et al. 5545* (MIN, MO, NY, UC, UTC, WS, WTU). Yakima Co.: Big Klickitat River, 3200 ft elev., 1 Sep 1903, *Cotton 1476* (WS, WTU); 1 mi above Rimrock along Wildcate Creek, 19 Jul 1937, *Dillon 879* (MO, NY, UC, UTC, WS, WTU); Wodan's Vale, Mt. Adams, 2100 m elev., 5 Aug 1906, *Suksdorf 5821* (WTU); 0.25 mi N of Tieton

Ranger Station, 2400 ft elev., 21 Jun 1936, *Reid 59* (WTU); Mt. Adams, 6000 ft elev., 30 Jul 1934, *Thompson 11164* (MIN, MO, NY, WTU); near Tieton River, 19 Jun 1932, *Warren 1813* (WTU); Snowplow Mtn., 16 mi N of Trout Lake, 9 Jul 1936, *Zuberbuhler s.n.* (NY, UC, WS).

Eriogonum umbellatum var. *sandbergii* (for John Herman Sandberg, 1848–1917, Swedish-born agronomist, botanist, and forester who collected widely in the Pacific Northwest) is restricted to a series of scattered populations in the Cascade Ranges of Oregon and Washington from Mt. Hood northward. Plants at lower elevations and in protected situations tend to be subshrubby as opposed to the somewhat more mat-like habit seen in the mountains. Sandberg's sulphur flower appears to be most closely related to var. *modocense*, differing in its larger size and typically glabrous and bright green upper leaf-surface. This has passed under the name var. *umbellatum*.

Eriogonum umbellatum Torr. var. *stragulum* Reveal, var. nov. TYPE: UNITED STATES. Idaho, Blaine Co.: Along U.S. Hwy. 20, 19 mi E of Fairfield and 0.1 mi E of Poison Creek, N of Magic Reservoir, on sandy loam volcanic soil associated with *Artemisia tridentata*, N43°20'15", W114°24'50", T1S, R17E, sec. 15 NWSE¼, 4850 ft elev., 20 Jun 2003, *J. L. Reveal 8394*. HOLOTYPE: NY. Isotypes: BRY, CAS, GH, ID, IDS, MARY, MO, MONTU, RENO, RSA, UC, UTC, US.

A *Eriogono umbellato* var. *umbellato* foliis late ellipticus vel ovatis cum sparse tomentosis a glabris differt.

Plants low spreading mats 2.5–10 (20) dm across; *leaves* in loose rosettes; leaf-blades broadly elliptic to ovate, (0.8) 2–3 (3.5) cm long, (0.7) 1–2 (2.5) cm wide, thinly tomentose to sparsely floccose abaxially, thinly floccose to glabrous and green adaxially; *flowering stems* erect, mostly 1–3 dm long, thinly floccose; *inflorescences* umbellate, the branches (1) 2.5–5 (8) cm long; *involucral* tubes 2–3 mm long, the lobes 3–5 mm long; *flowers* bright yellow, 4–7 (8) mm.

Representative specimens seen.

UNITED STATES: Idaho, Bannock Co.: Mink Creek Canyon, 4 Jul 1949, *Lingenfelter 735* (BRY, COLO, MIN, NY, RSA, UC). Boise Co.: 16 mi N of Horseshoe Bend, 9 Jun 1965, *Raven 18521* (MARY, NY). Camas Co.: 0.2 mi SE of Divide Reservoir, Mount Bennett Hills, 5800 ft elev., 20 Jul 1978, *Ertter 2401* (NY). Clark Co.: Dubois, T11N, R36E, sec. 16, 5200 ft elev., 1 Jun 1934, *Pechanec 34-20* (USFS). Custer Co.: 2 mi NE of Toxaway Lake, ca 8 mi WSW of Obsidian, 8000 ft elev., 12 Aug 1939, *Hitchcock & Martin 5702* (DS, ISC, NY, OKL, POM, UC, UTC, WTU). Elmore Co.: 26 mi NE of Mountain Home, 1 Jun 1966, *Collotzi & Davidse 672* (NY, UC, UTC); 10 mi S of the W side of Anderson Ranch reservoir, 12 Jun 1960, *Hitchcock & Muhlick 21991* (WTU); above Big Roaring River Lake, 20 mi N of Pine, 24 Aug 1937, *Meyer & Meyer 2311* (F, MO, NY, UC); head of Slater Creek, 6100 ft elev., 18 Aug 1930, *Pearse 25* (USFS). Fremont Co.: Island Park Plateau, along U.S. Hwy 20 between Antelope Flat Road and Little Butte Road, T11N, R42E, sec. 14, 6300 ft elev., 6 Jul 1992, *Markow 8885* (RM). Goodding Co.: rim of Thorne Creek Canyon, Mount Bennett Hills, 4900 ft elev., 15 Jun 1976, *Ertter 76-139* (NY). Lemhi Co.: Birch Creek Valley, above Willow Creek, ca 1.5 air mi NW of Nicholia, T12N, R29E, sec. 18, 6900-7200 ft elev., 1 Jul 1992, *Markow 8454* (RM). Madison Co.: along USFS Road 213 near Hinckley Creek, T4N, R42E, sec. 26, 7100-7400 ft elev., 20 Jul 1991, *Hartman & Molina 29984* (RM). Valley Co.: 9 mi E, 12 mi N of Bear Valley, 10 Jul 1940, *R. J. Davis 2744* (IDS, NY, OKL, UC, UTC). Nevada, Elko Co.: 0.2 mi N of Jay Creek, 2.4 mi NW of Nile Spring, T47N, R69E, sec. 23 NW¼, 24 Jul 1991, *Morefield & Price 5566* (NESH, NY, RENO). Wyoming, Teton Co.: Jackson Lake, 17 Aug 1899, *A. Nelson & E. Nelson 6545* (ISC, MIN, MO, NEB, NY, RM, UC, UTC); Snake River, 20 Aug 1899, *A. Nelson & E. Nelson 6572* (MO, NY, RM).

Eriogonum umbellatum var. *stragulum* (from the Latin *stragulus*, meaning "spreading" or "covering like a rug or mat," as to the sprawling nature of the matted caudex system) is found mainly from the foothills and low mountains on the northern edge of the Snake River Plains northward into the mountains of central Idaho. The spreading sulphur flower also occurs in scattered montane locations on the southern edge of the plains.

This expression has been referred to var. *umbellatum* but differs in have longer and broader leaf-blades that are thinly tomentose to floccose on the lower surface (not densely tomentose). The plant forms more open and sprawling mats than those found typically in var. *umbellatum*. In its leaf size and pubescence var. *stragulum* approaches the condition seen in var. *ellipticum* (Nutt.) Reveal, a variant with compound inflorescences that is found mostly to the north and west of known range of the new variety.

I have tentatively included here a single collection from extreme northeastern Elko Co., Nevada. It differs from all other specimens in having short leaf-blades (1–1.8 cm) and inflorescence branches (1–1.5 cm). The leaf tomentum is not that of var. *umbellatum*, but is somewhat denser than that seen in the majority of specimens assigned to var. *stragulum*. Further fieldwork is necessary in southern Idaho to ascertain the significance of the Nevada collection.

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